ATTN: Mr. Joe Engeln
Missouri Department of Natural Resources
PO Box 176; 1101 Riverside Drive
Jefferson City, MO 65102-0176

October 30, 2014

Dear Mr. Engeln,

The Missouri Coalition for the Environment (MCE) submits these comments on the latest final draft of the Missouri State Nutrient Reduction Strategy dated September 2, 2014 whose comment period ends October 31, 2014. As you already know, MCE has been a peer reviewer from the start. While MCE has shared its opinions and revisions throughout the process we felt compelled to write this external comment letter to address key issues in the NRS. MCE commends the effort that has been put into the nutrient reduction strategy so far but stresses that it still requires considerable additions to significantly, realistically, and measurably reduce nutrient pollution to Missouri's waters across all discharge sources. This comment letter, though it may point to specifics within the NRS as examples, seeks to address larger thematic issues of the document that the MCE hopes can be adjusted.

1. **The Missouri's nutrient reduction strategy[1] falls short of meeting key goals of the Stoner Memo[2] and goals stated within the strategy itself.**

The EPA Stoner memo, written in 2011 as the guiding framework for states to develop their nutrient reduction strategies, has visibly guided the development and authorship of Missouri's Nutrient Reduction Strategy (NRS).[3] While we recognize that a lot of work from all stakeholders has been put into the development of the Missouri NRS to date, it does not satisfy the goals of the Stoner Memo. In particular, sections 2, 4, 6, and 8 of the Stoner Memo:

> **Section 2 - Set watershed load reduction goals based upon best available information**
> Watershed nutrient load reduction goals are missing from the NRS. This may be because we lack comprehensive monitoring and thus baseline data is inadequate. However, the point of this requirement is to set provisional watershed load reduction goals *based on best available information* such that goals can be set and measurable progress made, while the numeric nutrient criteria rulemaking process is underway. A strong set of load reduction goals would

[1] Latest available final draft dated September 2, 2014
[2] http://www2.epa.gov/sites/production/files/documents/memo_nitrogen_framework.pdf, EPA last accessed 10/29/14
[3] "Missouri's strategy incorporates these policy elements from the memorandum." Pg. 11, Missouri Nutrient Reduction Strategy dated September 2, 2014

help drive BMP implementation and build the connection between stewardship practices and improved water quality. It is likely that the EPA and other agencies would take into account specific load reduction goals when allocating funding for non-point source nutrient pollution reduction best practices. This also presents the opportunity for important watershed attributes to be measured and monitored, such as riparian zones or wetlands, and put on track for measurable improvements that can be quantified in terms of load reductions.

Section 4 - Agricultural Areas

The address of this guideline is grayer. Certainly Missouri has recognized the need for management of various agricultural areas (e.g. animal manure, 4R, cover crop, grazing and livestock). The trend across the future actions of each agricultural strategy is to continue and, funding-dependent, expand the existing voluntary cost-share programs which the data show have had variable and often limited success in expanding agricultural BMP implementation.

The Stoner memo recommends "[l]ook[ing] for opportunities to include innovative approaches, such as targeted stewardship incentives, certainty agreements, and N & P markets, to accelerate adoption of agricultural conservation practices. Also, incorporate lessons learned from other successful agricultural initiatives in other parts of the country." These suggestions are not incorporated into the current NRS, leaving major room for growth in the agricultural areas' recommended actions. MCE especially recommends, as it has in the past, adopting successes from other states' NRS policies that are successful, are replicable, and thus are low risk.

Section 6 – Accountability and Verification Measures

There cannot be accountability and verification without metrics and goals to use as a reference for success. As a first priority, watershed based in-stream water quality monitoring mechanisms need to be decided upon and implemented (in addition to the required point source monitoring from 10 CSR 20-7.015(9)(D)(7)). Since the progress of many NRS efforts is dependent upon this data, it is critical that we have those systems in place.

Ultimately, the measuring scale and legal enforcement mechanism will be numeric nutrient criteria. Missouri has made it a goal to establish these values however it is on a delayed timeline (five to ten years). Missouri's track record to establish WQS in its originally set out timelines shows delays many times over (i.e. Wetlands WQS rollover for at least 3 triennial reviews now, lake nutrient criteria revision still needs to be done, 30 years to implement fishable/swimmable designated uses for 100k streams and lakes). Monitoring and WQS are essential to prioritizing target watersheds by utilizing the framework of impairments and TMDLs to address pollution sources using the very BMPs recommended in the NRS.

Section 8 - Develop work plan and schedule for numeric criteria development

A schedule and work plan for the development of numeric nutrient criteria seems to be missing from the NRS. MCE recommends using a Gantt schedule, as was done by the Municipal

Wastewater Treatment team, to clearly articulate the timeline and actions necessary to develop numeric nutrient criteria.

We urge DNR to revisit the memo to measure the adequacy of Missouri's NRS and make adjustments accordingly.

Moreover, the introduction of the NRS presents a logical structure to the document that carries each strategy through a temporal progression (a structure that falls in line with the Stoner memo): policy, strategy development, recommended actions, expected water quality improvements, and next steps.[4] Under each is a list of expectations 60+% of the NRS describes past actions, current status, and known BMPs-- while this is all necessary background and provides important background and baseline information, it is a problem that we don't pursue the same depth forming the future vision and the timeline to get there. All the NRS actions deviate to some extent from this structure and dance vaguely and incompletely around the latter three categories, which are significantly more challenging and imperative to address. Especially:

- "the scope of implementation expected in the next five years"
- "water quality outcomes expected to result from implementation of the recommended actions within the next five years"
- "actions and resources required to implement the recommended actions, the potential impediments to implementation and our approaches to overcome the challenges"

As a result of the lack of enforceable milestones, implementation timelines, or a thorough evaluation of nutrient loading conditions in the state, the vision and potency of the NRS is underdeveloped and thus it is impossible to imagine what progress Missouri can expect to see in the next five or even ten years. It is key for the state to develop the NRS further to move Missouri forward.

2. Catch 22: The NRS is paralyzed by the perpetual wait for more current information and research.

MCE supports Missouri's goal to make science-based decisions and policy. For decades, research relevant to the BMPs and decisions made in the NRS has been done. While research in some subject areas is necessary such as trading, there is abundant relevant information readily available on many practices that have yet to be broadly implemented such as cover crops, stream buffers and tile drainage management. Implementation priorities and goals can be set and progress reducing nutrient pollution can be achieved, without the handicap of waiting for new data and research. It too often seems that waiting for the newest most up to date data in the name of making the best science-based decisions becomes an excuse for inaction. Again there is ample sound science to support an array of BMPs: forested riparian buffers, tile dams, wetlands, fenced riparian exclusion, etc. The lack of implementation of these practices is at the heart of our lack of faith in voluntary measures.

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[4] Missouri NRS, Page 3, September 2, 2014

There are notable ironies around this rhetoric. For one, some long-expired datasets in need of updating have been ignored. Since the 1980s, wetlands throughout the state have indubitably changed: Missouri has made major investments in the WRP program, wetlands have been filled for development, and mitigation projects have been conducted state-wide. Meanwhile, the wetlands inventory dataset has not been updated since 1987 despite requests, the latest of which was voiced repeatedly. Another great irony is that agriculture interests cry out for more research before they are willing to take action, while also crying out for obfuscation of existing data and less transparency around agricultural practices pushing the majority of the nutrients into the Mississippi River Basin.

MCE encourages that DNR make decisions based on "best available science" and calibrate policies, should it be necessary, based on improved peer-reviewed scientific research.

3. **That said, additional streams of data and data transparency are necessary for nutrient reduction.**

As aforementioned, there is a lack of transparency of the agriculture industry and especially CAFOs. Transparency of all CAFOs is urgently necessary as a major step toward adequately managing nutrients. No improvements to existing CAFO management, regulation, or policy are made in the NRS. This is a gaping hole in the NRS if Missouri really wants to make significant strides in nutrient reduction. The animal waste from CAFOs is so spatially and chemically concentrated and prolific that their waste really ought to be regulated and treated like that of a city of human beings in order to prevent and address major water quality impairments.

While CAFO's have to meet certain requirements under the CWA to be permitted as no-discharge facilities, enforcement of these and especially the myriad small (<1000 AU) animal feeding operations has proven flawed. The NRS states that nutrient management plans for CAFOs "provide a significant level of environmental protection."[5] Meanwhile, thousands of gallons of animal waste are illegally dumped into the waters of Callaway County[6], peoples' quality of life and property values tank due to the opening of a CAFO nearby, rigorous scientific study indicated sprayed CAFO waste contributes to human health problems[7]: evidence shows that the regulation of CAFOs is too lax. It is frightening and confusing that there are not highly regulated waste/nutrient management and removal systems already in place.

An additional data stream that would be incredibly helpful in establishing baselines for nutrient loading into waters would be nutrient related purchases. Tracking the purchases state-wide of items like fertilizers, farm tiles, etc. would help DNR and regulatory agencies understand

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[5] Pgs. 15-16 of NRS dated September 2, 2014

[6] http://www.columbiatribune.com/news/local/hog-waste-spill-in-callaway-raises-concerns-about-cafo-plans/article_7c2f043e-9227-5481-a8bb-14bef64b5a7e.html Columbia Tribune, October 22, 2014

[7] http://ehp.niehs.nih.gov/121-a182/ Environmental Health Perspectives, June 3, 2013

nutrient trends over time, adjust and prioritize efforts, monitor progress, and set goals. Sales trends would be published in the annual/biannual nutrient reduction report.

4. **There is significant evidence to doubt voluntary participation as an effective primary method of augmenting BMP implementation.**

   There is no overwhelming incentive or hook to participate voluntarily in current nutrient reduction programs. Dependence on altruism or persuasiveness of educational campaigns is unreliable. Perhaps at some point peer pressure arises if all your neighbors are implementing a BMP except you, but this requires a majority of participation that does not exist in Missouri to become a probability. Even with the incentive of 75% cost-share, where demand is almost triple the budget and the maximum of new funding can be expected to match about half the demand[8], Missouri farms have a long way to go to routinely employ all the applicable BMPs in the NRS. This is true for some strategies more than others. As a suggestion, because there is such high cost-share demand, the state may want to cut cost-share to 50% and fund around 33% more projects. It is also possible that farmers are refraining from installing practices until cost-share becomes available meaning that the practice is completely dependent on a subsidy. If this was the case, then how much would it cost to pay every farmer in the state to be a good steward of their land and do their part to address nutrient loss?

   The NRS states that there is no "one size fits all solution" to address any one watershed/topic/problem – MCE very much agrees. This philosophy also applies to Missouri's approach to achieving nutrient reduction goals. Voluntary participation may have had success, notably the 47% reduction in sediment erosion achieved between 1984 and 2010, but cannot be expected for all issues based on their nature. For example, soil erosion is a very visible problem that reduces size and/or quality of a farmer's arable land. The visual cue and lower crop yields are of urgent concern to a farmer's property and bottom-line. On the other hand, an urgent and visible problem likely isn't being addressed when one chooses to cover crop. The need for a farmer to take action is not as apparent or likely for a preventative measure rather than an after-the-fact reactive solution to land literally washing away in front of their eyes.

   Data show that the progress of cover crop participation is minimal and has been growing very slowly over the last decade despite the fact that this is an old agricultural strategy. A rough calculation of the percent of Missouri farms that have implemented cover cropping is less than 1%.[9] Other strategies don't quantify and put into size perspective their extent of implementation and growth. These strategies are all voluntary. It is evident that these BMPs are generally not new. It is also obvious that the implementation of these BMPs is not fast enough

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[8] Email correspondence from Joe Engeln to Jenny Fung, dated September 15, 2014: "Through streamlining and automation, the department expects to up the cost-share to $30 million in FY15. We have also use MRBI and hope to use RCPP to get federal funds to match those state funds to the tune of another $15 million."

[9] From Appendix A I multiplied an average estimated 18,000 acres/year by 11 years (2003-2013) and divided that by the 30,000,000 total acres of farm in Missouri in 2002. Source: Census of Agriculture, Missouri Agricultural Statistics Service.

as is. Without new approaches it is insane to expect new outcomes and it is clear that voluntary programs have not been successful at addressing the nutrient loading in Waters of the US and have not achieved measurable reductions in the hypoxic Gulf Dead Zone. There is always someone asking for more money for their program, but when the structure of our agricultural system is fundamentally skewed against the environment and water quality, this investment too often turns out to be a temporary band-aid. Voluntary programs have not been effective enough, this has been made clear by the continued increase in nitrate loading documented in the recent USGS report, the destruction of hundreds of thousands of acres of CRP investments tied to high corn prices from the ethanol mandate.[10]

5. **MCE encourages the NRS's action plan and timeline contain a matrix of short and long term policy goals to achieve nutrient reduction goals and produce immediate and future solutions.**

MCE acknowledges the time delay for DNR to establish reliable science-based numeric nutrient criteria in Missouri. After new research, data analysis, policy making, and possibly nutrient trading too, the timeline is expected to be at least 5 years from now. Therefore, MCE encourages discussion of quicker policy actions about scientifically established, well-known, and under-implemented best water management practices. The MCE proposes two ideas here:

- 100ft Forested riparian buffers on all 100K flows
  Following the strong leading example from Minnesota whose Department of Agriculture partnered with the Environmental Working Group to spatially identify the riparian areas in need of reforestation.[11] This is another method of reaching and enforcing goals of BMPs set out in NRS, which include riparian buffers. Enforcement can be approached in myriad other ways than voluntary cost-share such as but not limited to regulatory requirement, partnership with organizations such as Audubon, USFWS, Forestry Service, DoI, DoA, etc.

- Require new tile drainage installations to be installed with tile dams
  As written into the Edge of Field practices section of the NRS and as presented by the NRCS at the 10/21/14 Hypoxia Task Force meeting in Godfrey, IL, tile dams are highly effective, simple, and inexpensive nutrient and water management structures for tiled farms. Throughout Missouri the majority of tiled farms lies around major rivers and effectively pipe nutrient filled water into our public waters. It is easy to install tile dams upon new installation of tiles—a quick policy action would be to require tile dams with the installation of new tiles.

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[10] http://www.ewg.org/research/paradise_lost
[11] Broken Stream Banks Project, http://www.ewg.org/research/broken-stream-banks, 2014

6. **A budgetary component to the NRS is necessary to understand the financial needs and attainability of each part and the sum of the nutrient reduction strategy.**

   The NRS would be greatly improved by a proposed budget from each strategic area or perhaps presented by each key agency participating in strategy implementation. The goal of the budget is to further build the vision of the outcome, gauge funding and implementation goals, and adjust recommended actions accordingly. A rough budget would help steer the ship, so to speak, by guiding the NRS more realistically to recognizable constraints, particularly funding. The MCE cannot imagine a realistic understanding of the NRS without a rough budget.

7. **Preventative pro-active regulatory guidance approach to new nutrient management practices**

   A leading cause of the nutrient pollution to our waters is the lack of regulation on nutrient producers and dischargers. The retroactive response to regulating polluting industries has created decades even centuries of waste accumulation in our natural resources that taxpayers bear the burden of today. It is clear that when possible preventative policy is preferable environmentally and fiscally to the status quo of waiting until things get out of control before regulating. Early regulatory guidance breaks our unsustainable system by saving taxpayers from future externality costs that should be carried by the polluters themselves.

   In the context of the NRS, MCE urges DNR to establish BMPs and protocol for new and newly recommended nutrient management actions. In the example of small wastewater treatment facilities, there is a switch to land application of waste. Just like irresponsible land applications of animal manure, unregulated and unguided applications of human waste can cause major harm to the environment and human health. Guidance about the best scientifically supported practices for land application for wastewater treatment facilities should be released in simultaneity with the department's recommendation to implement the activity.

8. **Realize the growth, capacity, and leadership potentials of OMW and SWCP to implement and enforce the NRS.**

   The NRS stresses the leading role that the Our Missouri Waters (OMW) program and SWCP will take to guide and implement some nutrient management. MCE believes there is significant potential in and between these two existing programs to successfully coordinate and implement NRS actions and reduce Missouri's nutrient loading to its waters and supports their commitment to and growth through the NRS. MCE supports heavy capacity building of both programs in order to realize their full potential. If funding can be secured, many new jobs for Missourians can be created through the OMW and SWCP. Creating new, secure, professional jobs for Missourians to help Missourians is incredible potential through the NRS that should not be overlooked.

   OMW is moving Missouri toward watershed (HUC-8) based permitting, monitoring, and enforcement. It only makes sense to regulate water issues from this scientifically common sense unit. There is no scientific basis or support to regulate water by political divisions of the land as

political lines are ecologically arbitrary. To be consistent and collaborative with OMW's watershed based efforts, it would advantageous and sensible to have other water management activities be watershed based as well. Therefore, MCE strongly recommends that SWCP districts are redrawn to watershed rather than counties to have a greater and more sensible impact. There is great potential for collaboration between the two programs in implementing the NRS.

9. There are varying levels of commitment to achieving nutrient reduction among the strategy areas.

First, MCE acknowledges the participation and effort of each stakeholder in the past few years of nutrient reduction stakeholder group meetings and in writing the Missouri NRS. It is clear that substantial and detailed research has been done for each strategy to frame its policy motivations, current BMPs, and extent of existing implementation. For most strategies, the strategizing becomes incomplete there. It is clear that the long time existing programs (i.e. voluntary cost-share) have had generally very limited participation and impact (exception: soil erosion control) and thus restating well-known current BMPs and increased promotion of them is a weak strategy that can reasonably be expected to be ineffective or only as effective as prior efforts.

As discussed at the end of the comment point 1 of this memo, commitments and future visioning are considerably lacking. This is true for all strategies except municipal and industrial point source, which goes above and beyond the other strategies to provide a 5 year timeline (Appendix C), milestones, and even a discussion about the triple-bottom line of sustainability. The point-source and wastewater strategies are the most developed and concrete and the substantially more thorough effort deserves recognition. At the same time, it is frankly a shame that the most invested strategy is the one that supposedly pollute the least (approximately 10% as stated in the NRS).

That no other stakeholders have gone so far as to provide an equal or greater level of thought and visioning despite having received commentary for several months to do so[12] shows a lack of commitment to action that is impotent and inadequate.

For its next final draft, MCE stresses each strategy answers completely the NRS tenets, stated again here:

- "the scope of implementation expected in the next five years"
- "water quality outcomes expected to result from implementation of the recommended actions within the next five years"
- "actions and resources required to implement the recommended actions, the potential impediments to implementation and our approaches to overcome the challenges"

[12] MCE has peer reviewed each strategy draft as released from June 4, 2014 through September of 2014 and submitted timely comments to authors asking for inclusion of enforceable milestones and timelines. Aside from the municipal and industrial point source group, these comments were ignored.

Again, because of the variable commitment to the NRS evidenced by a lack of enforceable milestones, timeline, and thoroughness of visioning seen in almost all the strategy areas, the NRS still needs significant work before it reaches an acceptable final state. Authors have the advantage of using the municipal and industrial point source strategy as a guiding example to further develop their strategies. For the state to measurably reduce nutrient loading to its waters, it is crucial that NRSs of prolific polluters match the level of action commitment of the most minor nutrient polluter, if not surpass them. It is advised that DNR have stronger guiding expectations of strategies and advise more closely. As is, it is impossible to imagine what progress Missouri can expect to see in the next 5-10 years of the NRS.

10. Stepping back from the nuts and bolts of the NRS: Nuggets of perspective about our system.

Taking a step back from the details of the NRS, it is important to revisit the broader picture: what are the origins of our nutrient issues that motivate policy and behavioral change via the NRS anyway?

Missouri is #2 in the nation for number of farms. It has a long history of agriculture and is home to many rural farming communities as well industrial agriculture. Missouri produces an impressive amount of agricultural products, which raises some questions: What crops are we producing? Are we meeting human food needs? As stated in the NRS:

> Corn and soybeans are the principle crops grown throughout the state. However, wheat is often intercropped with corn and soybeans and rice and cotton are grown in the Bootheel region…More than half of Missouri's agricultural receipts come from corn, soybeans, cattle, hogs and turkeys…[13]

Looking at the major crops listed—where is the rest of the food for humans? The standard food needs for any consumer include fresh vegetables and fruit which are not cataloged above. Where's the nutrition? Missouri has a great climate and soil for growing lots of crops, there are no ecological prohibitors as to why we don't grow more food to eat. Doing so would be of great benefit Missouri: greater economic independence of the state, economic and climate resiliency, delicious local and seasonal food, etc.

Additional questions arise: Who/what is eating the crops we produce? Where are they going? Who is profiting from the sales? What impact is wrought on our environment?

As it turns out, much of the agricultural output produced on US soil is exported.[14] This is true particularly for soy, wheat and rice. To speak more specifically to this topic, one can look through the lens of the growing pork industry. Smithfield was purchased by the Chinese company Shuanghui in 2013. Smithfield operates pig CAFOs across the US, producing lots of

[13] Page 7, Missouri NRS, draft dated September 2, 2014
[14] http://www.motherjones.com/tom-philpott/2014/01/are-agriculture-exports-killing-us

pork and an incredible amount of nutrient waste (rehash: lack of figure here reflects data non-transparency issue). Pork consumers in China receive the food. The profits from the pork sales go abroad to Shuanghui. The one-time company purchase profits go to Smithfield corp. Meanwhile, US resources are used and degraded at the expense of taxpaying citizens of the US. Benefits are unidirectional and the American land, water, and public are the ultimate losers. Natural resources are the public commons and the negative impacts of irresponsible agriculture are externalized to the resources depended upon by people who are not receiving any of the benefits. Recognizing this is a problem, how can policy that maintains this status quo system be made and accepted in good faith? Industrial agriculture operates in terms of global markets, leaving little room for community and watershed considerations. We must put limits on the extent of environmental exploitation we are willing to allow in Missouri, we cannot trust profit motives to protect our water resources.

11. The NRS lacks consideration of the regional effects of climate change and predictions of higher nutrient demand.

97% of scientists agree that human-induced climate change is underway. We are already experiencing the effects, which have been researched, published and reported about extensively for decades. Climate bands are moving northward, making MO hotter drier and more vulnerable to algal blooms, drought, and soil erosion. This should be of no surprise to the department.

Additionally, as suggested by water quality monitoring in the Missouri River at Hermann from 1980-2010, there has been a significant increase of nitrogen delivery from upstream waters. Additional analyses determines that even accounting for flow variability, nitrogen yield has increased greatly in the last 30 years.[15] There has been an upward trend in nitrogen load that is expected to continue. While we have a lower understanding of the mechanisms of phosphorous application and loading, there has also been a trend of increased phosphorous load in our waters. With this in mind, the same nutrient reduction planned today will be proportionally less significant upon implementation in its future context. The NRS must be more aggressive and committed to reducing both nutrient input and removal from our waters.

The NRS is a long term strategy that will need to adapt over time to changing conditions, whether they be climactic or financial. For the relevancy and resiliency of the NRS now and in the future, it needs to integrate an adaptive approach to climate change and trend projections of nutrient loadings.

12. The cohesion and readability of the NRS would be polished by formatting uniformity.

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[15] Page 31, Missouri NRS, dated September 2, 2014

Many authors contributed independent sections to the NRS. Without strict formatting and guidelines, understandably each author's work is structured differently than that of the next. In part, this has contributed to aforementioned failures of strategy depth and missing sections. As a more technical matter of document quality, formatting each strategy similarly (e.g. headings, figures, appendices, etc) will greatly improve readability and cohesiveness of the whole NRS. The document, still a work in progress, seems a hodge-podge of that is in need of greater organization. Uniform formatting makes it easier to use the document, consult the strategies, and hold each strategy more accountable to being equally as developed.

Conclusion

For the reasons stated above, MCE urges further development of the Missouri NRS. In particular MCE recommends revisiting the Stoner memo, comparable levels of development and commitment from all strategy areas, and broader more ecologically and fiscally responsible operatives. Missouri cannot expect to make reasonable headway in nutrient reduction without thorough and specific goals, measurable milestones, and maturity of vision. As Missouri is one of the few remaining MARB states to come up with its NRS, there are many existing NRSs from which Missouri can integrate lessons of success and failure to publish a mature, realistic, more fool-proof, and accomplishable NRS. MCE recognizes the challenge of writing and visioning the NRS and applauds DNR and strategy authors for their hard work and time input thus far. MCE appreciates the opportunity to comment and invites any questions, comments, or response to this letter.

Sincerely,

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